

IN THE CLAIMS

Claim 1-22 (Canceled).

Claim 23 (New): An image processing apparatus comprising:

an input configured to receive digital images of an object viewed from a plurality of projection directions both with and without a contrast medium injected into the object, respectively contrast images and mask images;

a storage unit configured to store the digital images;

a subtraction unit configured to subtract the digital images from each other to generate digital subtraction images;

a reconstruction unit configured to generate 3D digital images from plural digital images viewed from the plurality of projection directions;

an image processing unit configured to carry out surface rendering processing of the 3D digital images to generate surface rendered digital images for display;

an image synthesizing unit configured to generate a synthesis of two of the surface rendered digital images;

a display unit configured to display the synthesized digital images; and

an input device configured to be used by an operator to select one of three modes of 3D image processing on the object, the apparatus configured to operate according to this selection, such that in the first mode:

mask and contrast images are input and subtracted by the subtraction unit to generate digital subtraction images which are separately processed by the reconstruction unit to generate 3D digital mask and subtraction images, which are then separately processed by the image processing unit to generate surface rendered digital mask and subtraction images,

which are then synthesized by the image synthesizing unit into a combined 3D digital image which is displayed on the display unit;

in the second mode:

mask and contrast images are input and separately processed by the reconstruction unit to generate 3D digital mask and contrast images which are then subtracted by the subtraction unit to generate 3D digital subtraction images, the 3D digital mask and subtraction images then being separately processed by the image processing unit to generate surface rendered digital mask and subtraction images, which are then synthesized by the image synthesizing unit into a combined 3D digital image which is displayed on the display unit;

and in the third mode:

mask and contrast images are subtracted in the subtraction unit to generate digital subtraction images viewed from the plurality of projection directions, then the digital subtraction images and the digital contrast images are separately processed by the reconstruction unit to generate 3D digital contrast and subtraction images, which are then subtracted from each other in the subtraction unit to generate 3D digital mask images, the 3D digital mask and subtraction images then being separately processed by the reconstruction unit to generate 3D digital mask and subtraction images, which are then separately processed by the image processing unit to generate surface rendered digital mask and subtraction images, which are then synthesized by the image synthesizing unit into a combined 3D digital image which is displayed on the display unit.

Claim 24 (New): An image processing apparatus comprising:

an input configured to receive digital images of an object viewed from a plurality of projection directions both with and without a contrast medium injected into the object, respectively contrast images and mask images;

a storage unit configured to store the digital images;

a subtraction unit configured to subtract the digital images from each other to generate digital subtraction images;

a reconstruction unit configured to generate 3D digital images from plural digital images viewed from the plurality of projection directions;

an image processing unit configured to carry out surface rendering processing of the 3D digital images to generate surface rendered digital images for display;

an image synthesizing unit configured to generate a synthesis of two of the surface rendered digital images;

a display unit configured to display the synthesized digital images;

the apparatus being arranged such that mask and contrast images are input and separately processed by the reconstruction unit to generate 3D digital mask and contrast images which are then subtracted by the subtraction unit to generate 3D digital subtraction images, the 3D digital mask and subtraction images then being separately processed by the image processing unit to generate surface rendered digital mask and subtraction images, which are then synthesized by the image synthesizing unit into a combined 3D digital image which is displayed on the display unit.

Claim 25 (New): An image processing apparatus comprising:

an input configured to receive digital images of an object viewed from a plurality of projection directions both with and without a contrast medium injected into the object, respectively contrast images and mask images;

a storage unit configured to store the digital images;

a subtraction unit configured to subtract the digital images from each other to generate digital subtraction images;

a reconstruction unit configured to generate 3D digital images from plural digital images viewed from the plurality of projection directions;

an image processing unit configured to carry out surface rendering processing of the 3D digital images to generate surface rendered digital images for display;

an image synthesizing unit configured to generate a synthesis of two of the surface rendered digital images;

a display unit configured to display the synthesized digital images;

the apparatus being arranged such that mask and contrast images are subtracted in the subtraction unit to generate digital subtraction images viewed from the plurality of projection directions, then the digital subtraction images and the digital contrast images are separately processed by the reconstruction unit to generate 3D digital contrast and subtraction images, which are then subtracted from each other in the subtraction unit to generate 3D digital mask images, the 3D digital mask and subtraction images then being separately processed by the reconstruction unit to generate 3D digital mask and subtraction images, which are then separately processed by the image processing unit to generate surface rendered digital mask and subtraction images, which are then synthesized by the image synthesizing unit into a combined 3D digital image which is displayed on the display unit.

Claim 26 (New): An image processing apparatus comprising:

an input configured to receive digital images of an object viewed from a plurality of projection directions both with and without a contrast medium injected into the object, respectively “contrast” images and “mask” images;

a storage unit configured to store the digital images;

a subtraction unit configured to subtract the digital images from each other to generate digital subtraction images;

a reconstruction unit configured to generate 3D digital images from plural digital images viewed from the plurality of projection directions;

an image processing unit configured to carry out surface rendering processing of the 3D digital images to generate surface rendered digital images for display;

an image synthesizing unit configured to generate a synthesis of two of the surface rendered digital images;

a display unit configured to display the synthesised digital images; and

a distortion correction unit with a stored distortion distribution table containing correction vectors for use by the distortion correction unit to correct the mask and contrast images for pincushion distortion and sigmoid distortion;

the apparatus being configured to acquire the mask and contrast images and to correct them in the distortion correction unit;

and then either:

mask and contrast images are subtracted in the subtraction unit to generate digital subtraction images viewed from the plurality of projection directions, then the digital subtraction images and the digital contrast images are separately processed by the reconstruction unit to generate 3D digital contrast and subtraction images, which are then subtracted from each other in the subtraction unit to generate 3D digital mask images, the 3D

digital mask and subtraction images then being separately processed by the reconstruction unit to generate 3D digital mask and subtraction images, which are then separately processed by the image processing unit to generate surface rendered digital mask and subtraction images, which are then synthesized by the image synthesizing unit into a combined 3D digital image which is displayed on the display unit;

or mask and contrast images are input and separately processed by the reconstruction unit to generate 3D digital mask and contrast images which are then subtracted by the subtraction unit to generate 3D digital subtraction images, the 3D digital mask and subtraction images then being separately processed by the image processing unit to generate surface rendered digital mask and subtraction images, which are then synthesized by the image synthesizing unit into a combined 3D digital image which is displayed on the display unit;

or mask and contrast images are subtracted in the subtraction unit to generate digital subtraction images viewed from the plurality of projection directions, then the digital subtraction images and the digital contrast images are separately processed by the reconstruction unit to generate 3D digital contrast and subtraction images, which are then subtracted from each other in the subtraction unit to generate 3D digital mask images, the 3D digital mask and subtraction images then being separately processed by the reconstruction unit to generate 3D digital mask and subtraction images, which are then separately processed by the image processing unit to generate surface rendered digital mask and subtraction images, which are then synthesized by the image synthesizing unit into a combined 3D digital image which is displayed on the display unit.

Claim 27 (New): An apparatus according to any one of Claims 23 to 26, wherein the image synthesizing unit is configured to display the synthesized images in different respective colors.

Claim 28 (New): An apparatus according to any one of Claims 23 to 26, wherein the image synthesizing unit is configured to assign color information to the mask and subtraction images independently.

Claim 29 (New):. An apparatus according to any one of Claims 23 to 26, wherein the image processing unit is configured to carry out surface rendering by volume rendering processing.

Claim 30 (New): An apparatus according to any one of Claims 23 to 26, configured such that the display unit singly displays the 3D mask image or the 3D subtraction image in place of the synthesized image in accordance with a user instruction.